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ABSTRACT

Because the literature suggests that aerobic exercise is associated with physical health and psychological well-being, there is a concern with discovering how to improve adherence to such exercise. There is growing evidence that self-motivation, as measured by the Dishman Self-Motivation Inventory (SMI), is a redictor of adherence to regular exercise. Since self-motivation may be amenable to skills training, it is important to understand what skills constitute self-motivation. A study was conducted to identify correlates of self-motivation in a group of persons enrolled in a marathon clinic. Volunteers (N=220) involved in a 9-month adherence study completed the SMI, Heiby's Frequency of Self-Reinforcement Questionnaire, Wallston's Health Locus of Control Scale, Zung's Self-Rating Depression Scale, Speilberger's State-Trait Anxiety Inventory, and an exercise scale. The exercise scale assessed enjoyability of exercise, perceived ability to exercise, current exercise habits, motivation to exercise, education, and physical characteristics. The results provide concurrent and construct validity support for the SMI. It was found that scores on the SMI were positively related to measures of self-reinforcement and internal locus of health control, and negatively correlated with the adverse emotional states of anxiety and depression. If self-motivation is amenable to skills training, norms for the SMI must be developed so that persons with low self-motivation skills can be identified for training in an attempt to enhance compliance to a prescribed activity. A three-page list of references concludes the document. (NB)

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Cross-Validation of the Self-Motivation Inventory

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Cross-Validation of the Self-Motivation Inventory

Abstract

There is growing evidence that self-motivation, as measured by the Dishman Self-Motivation Inventory (SMI; Dishman & Ickes, 1981) is a predictor of adherence to regular exercise and possibly other prescribed health-related activities. The construct of self-motivation is discussed and correlates of the SMI are reported. It was found that scores on the SMI are positively related to measures of self-reinforcement and internal locus of health control and negatively correlated with aversive emotional states. The possibility of enhancement of adherence through self-motivation training and the need for norms for the SMI are discussed.

Cross-Validation of the Self-Motivation Inventory

Because there is a body of literature which suggests that aerobic exercise, such as in running, is associated with physical health (e.g., American Heart Association, 1975; Blackburn, 1978; Dishman & Gettman, 1980; Kobasa, Maddi, & Puccetti, 1982; Powell, Spain, Christenson, & Mollenkamp, 1986) and psychological well-being (e.g., Folkins & Sime, 1981; Ledwedge, 1980; Powell, et al., 1986), there is a growing concern in discovering how to improve adherence to such exercise. Adherence for up to six months to an exercise regimen is only about 50% among the general population (Dishman, 1981) and is similar for those whom one may expect to be particularly motivated to improve their physical condition, such as individuals who have suffered myocardial infarctions (Oldridge, 1979).

Behavioral characteristics of the exercise adherer have been investigated. In a recent review, Dishman (1982) concludes that most behavioral factors may predict initial interest but most do not predict eventual involvement. One reliable predictor, however, is level of self-motivation skills. Self-motivation is defined as the tendency to engage in a behavior regardless of extrinsic reinforcement (Dishman & Ickes, 1981). Other theorists have referred to this concept as intrinsic motivation or intrinsic reinforcement (e.g., Deci, 1972). Dishman and Ickes demonstrated that those strong on self-motivation are more likely to adhere to an exercise program and argue that the exercise setting may be somewhat irrelevant in predicting adherence for those who are highly self-motivated (Dishman, 1982). Perhaps situational antecedent and consequential conditions are relevant for adherence in those persons lacking in self-motivation skills and this accounts for individual differences in

response to the same exercise situation (Inger & Dahl, 1979). Dishman and Ickes (1981) reported that by considering only percentage or body fat and a score on a self-motivation inventory, they were able to accurately identify whether 80% of their subjects would eventually adhere to an exercise regimen. Others have reported that poor motivation is often offered by subjects as a reason for dropping out of an exercise program (e.g., Oldridge, Wicks, Hanle, Sutton, & Jones, 1978).

Since self-motivation is a potential predictor of exercise adherence that may be amenable to skills training, it is important to understand precisely what skills constitute this characteristic. As will be indicated below, the Dishman Self-Motivation Scale (Dishman & Ickes, 1981) has acceptable psychometric support as a self-report inventory insofar as the scale has demonstrated reliability and can validly predict exercise adherence. It is necessary, however, to understand the correlates of this measure in order to direct the focus of any attempt to increase self-motivation.

Dishman (1982) suggests that self-reinforcement skills partly constitute the characteristics of self-motivation. There are theories of self-control that view the self-reinforcement process as involving the skills of accurately monitoring one's own behavior, realistically evaluating that behavior and administering overt or covert rewards (e.g., Kanfer & Duerfeldt, 1967; Rehm, 1977). Attempts to measure these proposed components of self-reinforcement have failed to separate the three aspects of the process.

One of the components of the self-reinforcement process proposed by Rehm (1977) is that of accurately evaluating one's own behavior. In the exercise setting, this may include accurately attributing the benefits of exercise to the exercise process. Several studies have shown that the belief in the

effects of exercise is related to adherence (Dishman & Gettman, 1980; Sidney & Shephard, 1976). Furthermore, several studies have shown that an improvement in self-reinforcement skills improves exercise adherence (e.g., Keefe & Blumenthal, 1980; Turner, Polly, & Sherman, 1976) as well as adherence to other health-related behavior such as chronic medication use (Haynes, 1979). While the effects of health locus of control beliefs, i.e., taking responsibility for maintaining one's health, upon adherence has mixed support (Haynes, 1979), it may be that these beliefs are more directly involved in the self-motivation concept than in health behavior per se. It follows that if one attributes health to factors beyond one's control, then it is unlikely that one would attempt to control such factors. Self-control training has also been found to reduce anxiety (Meichenbaum, 1977) and depression (Fuchs & Rehm, 1977). Therefore, the construct of self-motivation may include characteristics related to the tendency to control anxiety and resist depression as well. Such a relation would be particularly interesting given that some studies have shown that aerobic exercise alleviates both anxiety and depression (e.g., Ledwidge, 1980; Doyne, Chambless, & Beutler, 1983).

The purpose of the present investigation is to identify correlates of self-motivation with the intention of clarifying the characteristics that result in self-motivation. The following hypotheses are proposed: Self-motivation is expected to be 1) positively related to regular exercise; 2) negatively related to anxiety and depression; 3) positively related to self-reinforcement; 4) positively related to accepting responsibility for health while negatively related to attributing health to factors beyond one's control; and 5) positively related to reporting to be motivated to exercise.

Method

Subjects. The participants of this study were 220 volunteers from the Honolulu Marathon Clinic multiethnic membership who were subsequently involved in a nine-month adherence study (Heiby, Onorato, and Sato, 1986). The subjects consisted of 128 men and 92 women whose mean age was 35.8 years and who completed an average of 15.4 years of education.

Materials. There were six measures for which the order of presentation was randomized: Dishman's Self-Motivation Inventory (SMI; Dishman & Ickes, 1981), Heiby's Frequency of Self-Reinforcement Questionnaire (FSRQ; Heiby, 1982; 1983), Wallston's Health Locus of Control Scale (HLOC; Wallston et al., 1976), Zung's Self-Rating Depression Scale (SDS; Zung, 1965), Speilberger's State-Trait Anxiety Inventory (STAI; Speilberger, Gorsuch, & Lushene, 1970), and an exercise scale developed by the present investigators.

The exercise scale consisted of single items with five point rating scales concerning enjoyability of exercise, perceived ability to exercise, and current exercise habits; motivation to exercise and open-ended questions concerning education, and physical characteristics such as height, weight, and age.

The Self-Motivation Inventory (SMI) was used as a measure of self-motivation. The SMI is a 40 item 5 point Likert-like inventory. Validation data include correlations between SMI scores and exercise adherence (.44), self-report of exercise frequency (.23), and the Thomas-Zander Ego Strength Scale (.63). Validation studies for the SMI used both college-aged (mean years = 19.1) and middle-aged (mean years = 40) populations (Dishman & Ickes, 1981). The SMI's reported internal and test-retest reliabilities are .91 and .92, respectively.

The Frequency of Self-Reinforcement Questionnaire (FSRQ) is a rationally derived 30 item true-false inventory. The FSRQ was used as a measure of the frequency of both overt (e.g., indulging in an enjoyable activity) and covert (e.g., thinking positive thoughts about yourself) reinforcement (Heiby, 1983). Thus, sample items from the FSRQ include: "I don't often think positive things about myself," and "There are pleasurable activities which I enjoy doing alone at my leisure" (Heiby, 1982). Validation data include correlations between FSR scores and frequency of self-praise in a variety of contexts (Heiby, 1982). Norms are based on a population of college students (N = 300) (Heiby, 1983). Test-retest and split-half reliabilities are .92 and .87 respectively.

Wallston's Health Locus of Control Scale (HLOC) is an 18 item 6 point Likert-like scale. The HLOC was used as a measure of locus of control expectancies related to health and yields three scores: internal, powerful others, and chance control over health beliefs (Wallston, Wallston, & Devellis, 1978). Validation studies reported include correlations between HLOC scores and health information seeking behavior. Normative data includes both college students and hypertensive patients. Test-retest and internal reliabilities for the HLOC are .71 and .72, respectively.

The Zung Self-Rating Depression Scale (SDS) was used as a measure of depression because validation data include cross-cultural studies with subjects of Japanese and Chinese ancestry. The SDS is a particularly appropriate measure of depresion for research in Hawaii where a large proportion of individuals are of such ancestry. Validation data is based both on normal and in-patient populations and includes correlation between SDS scores and global psychiatric ratings (.43 - .65), and MMPI depression scale scores (.59 - .75) (Goodstein, 1972).

The State-Trait Anxiety Inventory (STAI) was used as a measure of anxiety because it is one of the best standardized anxiety measures (Dreger, 1978). Norms for the STAI are based on 982 college freshmen, 212 prisoners, and 161 medical patients. Validation data include correlations between STAI-T (trait) scores and scores o the Manifest Anxiety Scale (.80), Affect Adjective Checklist (.52), and IPAT Anxiety Scale (.75). Test-retest and alpha reliabilities for the STAI-T are .73 - .84, and .86 - .92, respectively. There are two forms of the STAI: STAI-S and STAI-T. STAI-T was used in the present study

Procedure

On the first day of the Honolulu Marathon Clinic, the primary investigators and research assistants introduced themselves to the clinic members. The study was described as an attempt to discover "What Helps People Exercise" and members were encouraged to participate. Volunteers signed a consent form signifying that their participation was voluntary, confidential, and subject to voluntary withdrawal at any time without penalty.

The Honolulu Marathon Clinic meets in a public park every Sunday morning at 7:30 a.m. for a 9 month training period beginning in March and ending in December. There is no charge for the clinic. In 1983 approximately 500 individuals joined the Honolulu Marathon Clinic.

The first 10 minutes of the clinic are devoted to a lecture covering topics such as pacing, running shoes, running injuries, etc. After the lecture, clinic members divide into 3 groups and run together with the time of the run increasing throughout the duration of the clinic. During the first few weeks of the clinic, all 220 volunteers completed their

questionnaires at the clinic after the run. Most subjects needed 15 to 20 minutes to complete their questionnaire.

Results and Discussion

The means and standard deviations for each of the eleven measures are presented in Table 1. It is noteworthy that the obtained means were within one standard deviation of mean scores reported by authors of the SMI, FSRQ, HLOC, SDS, and STAI. This is important because the sample in this study is an unusual one having an average of over 15 years of education and being interested in learning to run a marathon.

In order to clarify the self-motivation construct measured by the SMI, scores on the eleven measures were subjected to correlational and principal components analyses (see Tables 2 and 3).

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insert Tables 1, 2, and 3 about here

The results of the correlational analysis provides support for the study's hypotheses. First, SMI scores were significantly and positively related to reports of exercising regularly. This replicates findings by Dishman (1982) and further validates that the SMI is measuring a characteristic that is relevant to the skills involved in adherence to an exercise activity although the size of the correlation coefficient is modest. The remaining correlations help clarify the construct of self-motivation.

It was hypothesized that self-motivation at least partly involves the use of self-control skills, including the tendency to self-administer positive reinforcement and reward. The results supported this hypothesis in the finding that FSRQ and SMI scores were positively correlated, suggesting that those individuals who engage in a high frequency of self-reinforcement/reward are also exhibiting high self-motivation. Self-reinforcement and reward are not synonymous with self-motivation, however, as the moderate .38 correlation indicates. The SMI is apparently measuring skills in addition to those measured by the FSRQ. Further construct validity is provided for the SMI from the negative relation between self-motivation and anxiety and depression. This is consistent with previous findings that self-control skills facilitate the reduction of anxiety (Meichenbaum, 1977) and depression (Fuchs & Rehm, 1977). The principal component analysis yields additional support for the possibility that self-motivation involves elements of self-control that are relevant to control of anxiety and depression. One of the four factors was comprised of variance accounted for by scores from the STAI, SDS, SMI, and FSRQ. The possible causal relations among anxiety, depression, exercise, and self-motivation is a critical area for further investigation. While it has been commonly accepted that exercise, such as running, may reduce anxiety and depression primarily through physiological mechanisms, the present result suggests a possible functional role for the psychological skill of self-motivation.

The hypothesis that self-motivation is related to health locus of control beliefs was somewhat supported. Those with high self-motivation scores reported beliefs that their own behavior affects their health. They also reported beliefs that reject the possibility that powerful others or chance control their health. HLOC scores were found to comprise a separate

factor from measures of self-motivation, suggesting that locus of health beliefs are less involved in the construct of self-motivation than are self-control skills.

Finally, it was hypothesized that scores on the SMI would be positively related to a single item self-report of being motivated to exercise regularly. Those who scored as being highly self-motivated on the SMI also indicated a self-perception of being motivated to exercise regularly. In contrast, SMI scores were not significantly related to reports of being able to exercise regularly or finding such exercise as enjoyable, suggesting that motivation measured by the SMI is not specific to individuals who are exercise enthusiasts. This suggestion is consistent with the finding that simple self-reports of motivation, ability, and enjoyability comprise a factor separate from the SMI.

Conclusions

The results of this study provide concurrent and construct validity support for the Dishman Self-Motivation Inventory with members of a marathon clinic. Concurrent validity is provided from the significant relation between SMI scores and reports of engaging in regular exercise and having the motivation required for an exercise regimen. Construct validity is derived from the positive relation between self-motivation and self-reinforcement/reward scores and from the negative relation between self-motivation scores and measures of anxiety and depression. Additional construct validity is provided from the relation of health beliefs to self-motivation. Those individuals reporting greater self-motivation also express beliefs of having some responsibility for one's health.

Of course, the generalizability of these data must be considered. The findings of Dishman and Ickes (1981) were replicated in this study using a biased sample of would-be marathoners. This replication suggests that the relation between SMI scores and compliance to regular exercise is a robust one because the sample involved restricted ranges on most measures.

It would be interesting to determine whether self-motivation as measured by the SMI is a skill that is amenable to training. It is expected that training in beliefs of internal control and in techniques of self-control will improve self-motivation scores and, thus, one's compliance to activities with little or delayed naturally-occurring positive reinforcement. If self-motivation is amenable to skills training, then it would be necessary to develop norms for the SMI so that persons with low self-motivation skills can be identified for training in an attempt to enhance compliance to a prescribed activity.

Table 1

Means and Standard Deviations

	Mean	Standard Deviation
SMI	145.22	23.43
FSRQ	21.73	4.07
HLOC-INT	30.00	4.46
HLOC-PO	14.64	5.36
HLOC-CH	14.46	5.46
SDS	31.67	6.78
STAI-T	35.97	8.55
Exercise	0.97	0.34
Ability	4.69	0.69
Enjoyable	4.53	0.83
Motivation	4.18	0.89

Scores derived from the Dishman Self-Motivation Inventory (SMI); Heiby Frequency of Self-Reinforcement Questionnaire (FSRQ); Wallston Health Locus of Control Measure (HLOC) for Internal (INT), Powerful Others (PO), and Chance (CH) scores; Zung's Self-Rating Depression Scale (SDS); Speilberger's State-Trait Anxiety Inventory-Trait form (STAI-T); a yes (1) - no (0) question of whether one exercises regularly (Exercise) and three Likert 5-point scales indicating degree of ability, enjoyability, and motivation concerning regular exercise (5=very much).

Table 2

Intercorrelations

	SMI	FSRQ	HLOC INT	HLOC PO	HLOC CH	SDS	STAI-T	Exer-cise	Abi-lity	Enjoy-able
SMI	--	--	--	--	--	--	--	--	--	--
FSRQ	.38	--	--	--	--	--	--	--	--	--
HLOC-INT	.21	NS	--	--	--	--	--	--	--	--
HLOC-PO	-.15	-.22	NS	--	--	--	--	--	--	--
HLOC-CH	-.27	-.24	-.31	.45	--	--	--	--	--	--
SDS	-.39	-.48	-.16	.22	.22	--	--	--	--	--
STAI-I	-.49	-.63	-.13	.15	.20	.62	--	--	--	--
Exercise	.17	.10	NS	NS	NS	NS	-.17	--	--	--
Ability	NS	NS	NS	NS	-.18	-.23	-.18	NS	--	--
Enjoyable	NS	NS	NS	NS	NS	-.23	-.26	.13	.69	--
Motivation	.23	.14	.20	NS	-.17	-.18	-.29	NS	.50	.60

P .05 for all reported coefficients

Table 3

Principal Component Analysis

Factor loadings

I		II		III		IV	
STAI-T	.89	Enjoy	.91	HLOC-INT	-.61	Exercise	.83
ZUNG	.83	Ability	.83	HLOC-PO	.63		
SMS	-.62	Motivation	.83	HLOC-CH	.84		
FSRQ	-.79						
%VARIANCE EXPLAINED	26.90		23.40		16.30		10.40

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